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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/470,057	12/22/1999	HIROYUKI FUJII	3874	5712

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EXAMINER

SANTIAGO, MARICELI

ART UNIT PAPER NUMBER

2879

DATE MAILED: 03/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/470,057

Applicant(s)

FUJII, HIROYUKI

Examiner

Mariceli Santiago

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on _____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30, 35 and 36 is/are rejected.
- 7) ☒ Claim(s) 31-34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 27, 35 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "such as Ce" in line 7, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 27 recites the limitation "such as Ce" in line 7, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 35 recites the limitation "said second negative electrode layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 35 recites the limitation "said third negative electrode layer" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 35 recites the limitation "the first negative electrode layer" in line 5. There is insufficient antecedent basis for this limitation in the claim.

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Claim 36 recites the limitation "said first, second and third negative electrode layers" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1, 2 and 4-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura et al. (US 5,500,568).

Regarding claims 1, 2 and 4-10, Nakamura discloses an organic EL device having a luminescent material-containing layer interposed between a positive electrode and a negative electrode, the negative electrode containing f and p elements wherein f is at least one element selected from Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er,

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Tm, Yb and Lu (Column 2, lines 20-27) and p is at least one element selected from Zn, B, Al, In, Tl, Si, Ge, Sn, P, Sb, Bi, S, Se and Te (Column 2, lines 16-19).

The Examiner notes that it is elementary that mere recitation of a newly discovered function or property, inherently possessed by things in the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. *In re Swinehart*, 169 USPQ 226 (CCPA 1971). Thus, the functional limitations "said f is at least one element selected from those having electronegativity values higher than that of calcium, and, equal to or lower than that of vanadium, and said p is at least one element selected from those having electronegativity values equal to or higher than that of aluminum", as recited in claim 1, the functional recitation "said p element is selected from those having electronegativity values equal to or higher than that of aluminum, lower than that of carbon, and lower than that of iodine", as recited in claim 3, and the functional recitation "a mean electronegativity value E_{AVE} , as calculated from weighting an electronegativity value of each negative electrode-constituting element by a portion in number of its atoms present in the negative electrode, is in the range of 1.50-1.91", as recited in claim 11, are taught by Nakamura under the principles of functional inherency.

In regards to the recitation "designed to supply an electrical energy to the luminescent material that emits light upon receipt of the energy", it has been held that

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the recitation of an element being capable of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Claims 13, 14, 16-20, 22-27 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Hosokawa et al. (US 6,284,393 B1).

Regarding claims 13, 14, 16-20 and 22-26, Hosokawa discloses an organic EL device having a luminescent material-containing layer interposed between a positive electrode and a negative electrode, the negative electrode containing f, p and d elements wherein f is at least one element selected from Sc, Y, Eu and Yb (Column 8, lines 8-24), p is at least one element selected from B, Al, In, P and Bi (Column 8, lines 25-39, and Column 9, lines 40-45) and d is at least one element selected from Ni, Pt, Ag and Au (Column 13, lines 45-53).

The Examiner notes that it is elementary that mere recitation of a newly discovered function or property, inherently possessed by things in the prior art, does not cause a claim drawn to distinguish over the prior art. Additionally, where the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. *In re Swinehart*, 169 USPQ 226 (CCPA 1971). Thus, the functional limitations "said f is at least one element selected from those having electronegativity values higher than that of calcium, and, equal to or lower than that of vanadium, said p is at least one

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element selected from those having electronegativity values equal to or higher than that of aluminum, and said d is at least one element selected from those having electronegativity values equal to or higher than any of those of iron, cobalt and nickel, and equal to or lower than that of gold, said d being excluded from the selection of said f or p element", as recited in claim 13, the functional recitation "said p element is selected from those having electronegativity values equal to or higher than that of aluminum, lower than that of carbon, and lower than that of iodine", as recited in claim 14, and the functional recitation "a mean electronegativity value E_{AVE} , as calculated from weighting an electronegativity value of each negative electrode-constituting element by a portion in number of its atoms present in the negative electrode, is in the range of 1.50-1.91", as recited in claim 27, are taught by Nakamura under the principles of functional inherency.

In regards to the recitation "designed to supply an electrical energy to the luminescent material that emits light upon receipt of the energy", it has been held that the recitation of an element being capable of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

Regarding claim 29, Hosokawa discloses an organic EL device having a luminescent material-containing layer interposed between a positive electrode and a negative electrode, the negative electrode containing f and p elements wherein f is at least one element selected from La, Ce, Eu and Yb (Column 8, lines 8-24), and p is at least one element selected from Zn, Al, Sn, and Sb (Column 8, lines 25-39, and Column 9, lines 40-45).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 5,500,568) in view of Arai (US 6,163,110).

Regarding claim 3, Nakamura discloses an organic EL device comprising a luminescent material-containing layer. Nakamura is silent in regards to the limitation of the luminescent material-containing layer at least containing a host, as a principal component, and a fluorescent dopant. Nakamura also fails to disclose a ratio in molar mass of the dopant molecule to the host molecule (dopant/host) is in the range of 0.344-2.90. However, Arai discloses an organic EL device having a luminescent material-containing layer at least containing a host, as a principal component, and a fluorescent dopant, hence, is possible to vary the wavelength performance of the light emission, thereby making the light emission possible on a longer wavelength side and improving the light emission efficiency and stability of the device (Column 7, lines 42-54). Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the luminescent material-containing layer disclosed by Arai in the organic EL device of Nakamura in order to vary the wavelength performance of the light emission, thereby making the light emission possible on a

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longer wavelength side and improving the light emission efficiency and stability of the device.

In regards to the limitation of the ratio in molar mass of the dopant molecule to the host molecule (dopant/host) being in the range of 0.344-2.90. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a ratio in molar mass of the dopant molecule to the host molecule (dopant/host) in the range of 0.344-2.90, since optimization of workable ranges is considered within the skill of the art.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 5,500,568).

Regarding claim 12, Nakamura discloses the claimed invention except for the limitation of the organic EL device having a controlled luminance of 100 cd/m^2 , and an emission efficiency, as calculated by dividing the luminance by a current density, being not below 10.0 cd/A . It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to provide an organic EL device having a controlled luminance of 100 cd/m^2 , and an emission efficiency, as calculated by dividing the luminance by a current density, being not below 10.0 cd/A , since discovering an optimum value of a result variable is considered within the skills of the art.

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Claims 15, 21 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosokawa et al. (US 6,284,393 B1) in view of Arai (US 6,163,110).

Regarding claim 15, claim 15 is rejected for the same reasons as given in claim 3 above.

Regarding claims 21 and 30, Hosokawa discloses the claimed invention except for the limitation of f being at least one element selected from Ce, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm and Lu. However, Arai discloses an organic EL device comprising a negative electrode comprising an f element of at least one element selected from Ce, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm and Lu in order to achieve effective electron injection (Column 4, lines 63-67). It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. Thus, it would have been obvious to one having ordinary skills in the art at the time the invention was made to have a negative electrode comprising an f element of at least one element selected from Ce, Pr, Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm and Lu, since the selection of known materials for a known purpose is within the skill of the art.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosokawa et al. (US 6,284,393 B1).

Regarding claim 28, claim 28 is rejected for the same reasons given in claim 12 above.

Allowable Subject Matter

Claims 31-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 35 and 36 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 31, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 31, and specifically comprising the limitation of the negative electrode comprises a first layer closest to the luminescent material-containing layer and a second layer overlying the first layer and a third layer overlying the second layer, and wherein the first negative electrode layer is substantially formed from the f element, the second negative electrode layer from a mixture or compound of the f and p elements and the third negative electrode layer from the p element.

Regarding claims 32-33, claims 32-33 are allowable for the reasons given in claim 31 because of their dependency status from claim 31.

Regarding claim 34, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 34, and specifically comprising the limitation of the negative electrode comprises a first layer closest to the luminescent material-containing layer and a second layer overlying the first layer and a third layer overlying the second layer, and wherein the first negative electrode layer is

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substantially formed from the f element, the second negative electrode layer from a mixture or compound of the f and p elements and the third negative electrode layer from the p element.

Regarding claim 35, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 35, and specifically comprising the limitation of the second negative electrode layer has such a composition gradient in its thickness direction that toward its interface with the third negative electrode layer from its interface with the first negative electrode layer, its f element content decreases while its p element content increases.

Regarding claim 36, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set forth in claim 36, and specifically comprising the limitation of at least one of the first, second and third negative electrode layer contains an additional element different from the constituent element thereof.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Arai et al., in US 5,952,779, discloses an organic EL device comprising a cathode comprising materials having low work function.

Kusunoki et al., in US 5,936,257, discloses a thin-film electron-emitting device having a multi-layered top electrode.

Hung et al., in US 5,776,623, discloses a transparent electron-injecting electrode for use in an EL device.

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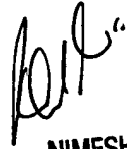
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mariceli Santiago whose telephone number is (703) 305-1083. The examiner can normally be reached on Monday-Friday from 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (703) 305-4794. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MSgo 3/12/02
Mariceli Santiago
Patent Examiner
Art Unit 2879


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